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RESEARCH ARTICLES

Effect of Students' Perceptions of Course Load on Test Anxiety

Sujit S. Sansgiry, PhD and Kavita Sail, BS

College of Pharmacy, University of Houston

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Objectives. The objective of this study was to examine the association between student perceptions of course load, their ability to manage time, and test anxiety.

Methods. A survey was self-administered to all students (professional years 1 through 4) enrolled in the PharmD curriculum at the University of Houston (2001) with items measuring test anxiety, perceived course load, and ability to manage time.

Results. One hundred ninety-eight students participated in the survey (response rate P1 = 48%, P2 = 52%, P3 = 52%, P4 = 72%). There was a significant difference in students' perception of course load, ability to manage time, and test anxiety scores across the 4 years. Test anxiety was positively correlated with students' perceptions of course load and negatively related to their ability to manage time with course work.

Conclusions. Students' perception of course load and their ability to manage time with their course work is associated with test anxiety. Future studies should evaluate the role of stress/time management programs to reduce stress and anxiety.

Keywords: examination, test anxiety, course load, time management, academic performance, student attitudes

INTRODUCTION

Identifying factors influencing student achievement and academic performance is a quest for most teachers and a primary goal of most educational researchers.[1] Test anxiety is a major predictor of academic performance[2-4] and various studies have demonstrated that it has a detrimental effect.[3,5,6] Students with high test anxiety develop and maintain less complete conceptual representations of the course content. To improve academic performance, academic counselors often focus on the underlying causes of test anxiety and on the student's studying behavior.[7] Many factors can lead to the development of test anxiety. Students' past experiences and beliefs, which have been shaped by a complex interplay of factors, may result in unique reactions to a test situation and lead to test anxiety.[2] These may include their past experiences with courses and their perceptions of course load, as well as their ability to manage time.

Test anxiety has been defined as the reaction to stimuli that are associated with an individual's experience of testing or evaluating situations.[8] Hence, it can also be defined as the reaction that students exhibit to examinations. Two principal components of test anxiety are cognition and emotion.[9] The cognitive component is the mental activity that revolves around the testing situation and its potential implications on the individual and constitutes elements, such as thinking about consequences of failure,[6] worrying a great deal about examinations,[10] and lack of confidence in one's ability.[11] The emotionality component is the physiological component of test anxiety leading to tension, apprehension, and nervousness towards examinations, which may be associated with somatic symptoms such as palpitation, nausea, and perspiration.[6,10]

Negative effects of test anxiety on academic performance can be explained by 2 models: the interference model and the learning-deficit model.[12-14] According to the interference model, anxious students are distracted or perturbed due to task-irrelevant cognitions and negative thoughts during test taking.[12] However, the learning-deficit model proposes that it is students' ineffective study habits during preparation for a test that causes them to be anxious and affects performance on the test.[15] The 2 models sometimes act in an integrated manner to affect a student's performance.[3] Though individuals with test anxiety do not have any kind of intellectual deficiency, they are not able to tackle test-taking issues effectively.[13,14] Students with high levels of test anxiety are more likely to employ less-effective study strategies, and more likely to procrastinate and engage in repetitive memorization strategies.[15,16] Demographic variables such

Corresponding Author: Sujit S. Sansgiry, PhD. Address: Department of Clinical Sciences and Administration, College of Pharmacy, University of Houston, Texas Medical Center, 1441 Moursund Street, Houston, TX 77030. E-mail: ssansgiry@uh.edu

as age, gender, ethnicity, and study habits also affect test anxiety levels.[17]

Perceived course load could be one of the factors leading to test anxiety. Extensive course load and comprehensive information in academic curricula necessitates use of proper time management and effective study strategies.[18] Time management can be defined as clusters of behavioral skills that are important in the organization of study and course load.[19] Hence, one of the aspects of time management is to develop effective study habits that essentially help in managing the study load. Time management skills typically include planning in advance, prioritizing the work, and adhering to the preset schedules.[20] Students' perceptions of their learning environment are important determinants of the quality of their learning outcomes. The course load may also affect the manner in which students learn and can be useful in the design and evaluation of curricula.[21] Students' perceptions of the teaching and the learning environment, such as assessment methods, relevance of the course, and their course load also influence students' approaches to learning.[22] Thus, students' perceptions of these curriculum elements need to be taken into account in curricula assessment and evaluation.

A study of medical, nursing, and pharmacy students reported that pharmacy students demonstrated the highest psychological distress.[23] The reasons behind these results are not clear. Although studies have focused on different predictors of test anxiety, none has studied the relationships among pharmacy students' perceptions of course load ability to manage time and test anxiety, which are the focus of this study.

METHODS

This study utilized a cross-sectional survey design. A prevalidated questionnaire was administered to students enrolled in the doctor of pharmacy (PharmD) curriculum at the University of Houston (Texas). A non-probabilistic convenient sampling procedure was used. Participation in this study was voluntary and the protocol was approved by the Institutional Review Board.

Perceived course load was measured on a 0-100 scale with anchors at 0 = low, 50 = moderate, and 100 = high. Students were asked their perception of their study/course load for each respective year of enrollment in the PharmD program. For example, first-year students indicated their perception of their course load for the first year, while fourth-year students indicated their perception of their course load for the fourth year as well as the 3 preceding years. Perception of course load included the amount of study material as well as the perceived degree of difficulty of the study material. Ability to manage time was also measured on a 0-100 scale with anchors at 0 = not at all, 50 = somewhat, and 100 = all the time. A scale that measured test anxiety was adapted from a previously validated test-anxiety inventory (Appendix 1).[24] For 10 items, students were asked to rate their emotions with respect to test anxiety on a 5-point scale on which 1 = not at all typical of me and 5 = very much typical of me. A higher score would indicate higher test anxiety. Information on variables such as age, gender, race, marital status, dependants, number of student organizations involved, and concurrent employment was obtained along with the year of enrollment. Furthermore, strategies used by students to cope with test anxiety were also elicited.

Data were collected during a class lecture in April 2001, 2 weeks prior to the final examination. A week when no tests were scheduled was intentionally chosen. The curriculum in the first year included courses in pharmacy practice, pharmacy skills, pharmaceutics, cellular life sciences, organ systems life sciences, and pharmacy management, with 17 credit hours during the first semester and 18 during the second. The second-year curriculum included pharmacodynamics (7 credits), pharmacokinetics, and pharmacy skills in the fall semester (14 credits), and pharmacodynamics (7 credits), pharmacy practice, pharmacy skills, and pharmacy management in the spring semesters (16 credits). The third-year curriculum included pharmacy practice, pharmacy skills, physical assessment, toxicology, and advanced therapeutics in the fall semester (16 credits), and pharmacy practice, pharmacy skills, pharmacy management, pharmacy law/ethics, and advanced therapeutics in the spring semester (16 credits). The fourth-year curriculum included mainly experiential courses along with a 1-hour seminar course (19 credits each semester). The majority of the didactic courses included instructions using Microsoft *PowerPoint* software or overhead projection of transparencies. Multiple-choice questions were used on examinations in the majority of courses.

Data were coded and analyzed using the *SAS* statistical package (version 9.0) with a priori set alpha level of 0.05. Reliability analyses for the domains were carried out by calculating Cronbach's coefficient alpha. A higher score (0.7 and higher) indicated acceptable reliability of the domains measured. Descriptive analyses, Spearman correlation analyses, and ANOVA were conducted to evaluate the study objectives.

RESULTS

One hundred ninety-eight students completed the survey instrument. The response rate for each year (P1 = 48%, P2 = 52%, P3 = 52%, P4 = 72%) was adequate considering the voluntary nature of the data collection process. Descriptive statistics with respondents'

demographics can be viewed in Table 1. The mean age of the students was 26.3 (±3.5) years, with more female students than male students responding (72.4%). Approximately 51% of the respondents were Asian/Pacific Islander, with the next largest racial/ethnic group being white (31%). The majority of the respondents indicated they were single (73.8%) and did not have any children or dependants (87.1%). More than half of the participants were working (59.7%), with the average hours employed being 14.7 (±8.1) hours per week. The number of students with concurrent employment was higher among fourth-year students (74.2%), compared to students in other didactic years. The mean grade point average reported by students was 3.1 ± 0.5. Students were more active in student organizations during their third year (61.4%) compared with students in other didactic years.

The scale that was used to measure test anxiety was reliable, with a Cronbach's alpha value of 0.9 (Table 2). In general, students in this study indicated low to moderate test anxiety (2.6 ± 0.8). Approximately 44% of students indicated experiencing nervousness during tests. In addition, 66.2% experienced some level of anxiety during examinations even though they were well prepared for a test. Furthermore, 58.8% of the students revealed that they were somewhat bothered by taking examinations. Approximately 15% of the students indicated that they were depressed after taking an examination. Some students indicated they exhibited physical symptoms such as perspiration (13.7%), stomach upset (17.2%), and increased heart beats (22.3%) while taking an examination.

Before proceeding with the analysis to identify the effect of courses taught in the year enrolled, an ANOVA was performed to evaluate the consistency of scores for perception of course load and ability to manage time. The scores were consistent for the course load and ability to manage time variables across the respective years tested

Table 1. Characteristics of PharmD Students Participating in a Survey of the Effect of Students' Perception of Course Load on Test Anxiety

Variable	P1 Students, n = 44	P2 Students, n = 45	P3 Students, n = 46	P4 Students, n = 63	Overall N = 198
Age, mean (SD)*	26 (4)	26 (3)	26 (3)	27 (3)	26 (4)
Gender, %					
Male	16	35	23	34	27.5
Female	84	65	77	66	72.5
Marital Status, %					
Single	75	78	70	72	73.8
Married	23	20	28	26	24.1
Unmarried, living with a partner	2	2	2	2	2.1
Ethnicity, %					
White	35	15	36	37	31.3
African American	5	11	11	—	6.1
Hispanic	14	4	2	8	7.2
Asian/Pacific Islander	42	63	48	50	50.8
Other	4	7	3	5	4.6
Dependants or children, %					
Yes	16	11	11	13	12.9
No	84	89	89	87	87.1
Concurrent Employment, %					
Working	54	50	55	74	59.7
Not working	46	50	46	26	40.3
Involvement in student organizations, no.					
None	3	25	12	10	12.2
1	26	22	7	25	20.2
2	44	31	20	32	31.4
More than 2	27	22	61	33	36.2

*Age range in years (minimum-maximum) for first-year students, 21-39; second-year, 21-39; third-year, 23-36; fourth-year, 23-38; overall, 21-39

Table 2. Test Anxiety Scores of PharmD Students

Variable*	Not at all typical of me, %	Not very typical of me, %	Somewhat typical of me, %	Fairly typical of me, %	Very much typical of me, %	Mean (SD)
Failure to perform better	9.8	37.1	32.0	13.9	7.2	2.7 (1.1)
Nervousness	16.5	39.7	22.2	17.0	4.6	2.5 (1.1)
Perspiration	39.5	36.3	10.5	10.0	3.7	2.0 (1.1)
Task-irrelevant cognitions	20.2	43.5	22.8	9.3	4.2	2.3 (1.0)
Panicky	15.2	36.1	25.7	16.2	6.8	2.6 (1.1)
Upset stomach	26.4	38.3	18.1	15.6	1.6	2.2 (1.1)
Increased heartbeats	20.7	37.3	19.7	19.2	3.1	2.5 (1.1)
Depression	19.8	41.7	22.9	10.4	5.2	2.4 (1.1)
Worry	14.6	26.6	20.8	21.9	16.1	2.9 (1.3)
Anxious even when well-prepared	13.0	20.8	27.1	26.6	12.5	3.1 (1.2)

Test anxiety = 2.6 ± 0.8; Cronbach alpha = 0.9
*Refer to Appendix 1 for item description

($p > 0.05$). However, there was a significant difference ($p < 0.05$) in test anxiety, perception of course load, and time management across the 4 years. Student perception of course load was the highest among P2 students (88.1 ± 12.9) and lowest among P4 students (67.4 ± 21.2). A post hoc Scheffe's test revealed significant differences between P2 and P4 students in level of test anxiety, perception of course load, and ability to manage time ($p < 0.05$; Table 3). There was also a significant difference in level of test anxiety between P2 and P3 students ($p < 0.05$). There was a significant difference in perception of course load among P1 and P4 students ($p < 0.05$).

A Spearman correlation analysis indicated that students' perceptions of course load were positively correlated with test anxiety ($r = 0.24$, $p < 0.001$). Students' ability to manage time was, however, negatively correlated with test anxiety ($r = -0.20$, $p < 0.001$). Further, student age ($r=0.91$, $p < 0.001$) was significantly associated with test anxiety, with younger students reporting lower test anxiety compared to older students. Other variables such as gender, ethnicity, marital status, employment, number of children, and number of student organizations involved were not significantly associated with test anxiety.

Students used many coping strategies (Figure 1) during times of stress and/or anxiety. Many students indicated "talking with a family member" as their primary strategy for coping with stress and/or (39.4%) followed by talking with classmates (33.2%) and using self-coping strategies (32.6%). Only about 2% of the students indicated approaching a faculty member or counselor to help them cope with stress and anxiety.

DISCUSSION

This study revealed some interesting results about test anxiety and perceptions of course load in pharmacy students that can be applied by institutions while preparing academic curricula and help students reduce test anxiety. The majority of the pharmacy students in this study experienced moderate test anxiety. This was consistent with previous literature which indicated an obvious psychological distress among health care professionals.[23] Test anxiety was also positively associated with the students' perception of course load. Test anxiety has been investigated by researchers mainly due to its negative effect on academic performance.[25,26] Hence, interventions aimed to reduce test anxiety may improve academic performance in pharmacy students.

Table 3. Test Anxiety, Students Perception of Course Load, and Ability to Manage Time Among First-, Second-, Third-, and Fourth-Year PharmD Students

Variables	First-Year	Second-Year	Third-Year	Fourth-Year
Test anxiety*†	2.5 (0.9)	2.9 (1.0)	2.3 (0.7)	2.3 (0.8)
Perception of course load*‡	79.5 (17.5)	88.1 (12.9)	70.7 (16.4)	67.4 (21.2)
Ability to manage time*	68.3 (16.6)	60.2 (23.6)	72.2 (19.4)	78.5 (17.9)

*Second and fourth year students are significantly different ($p < 0.05$)
†Second and third year students are significantly different ($p < 0.05$)
‡First and fourth year students are significantly different ($p < 0.05$)

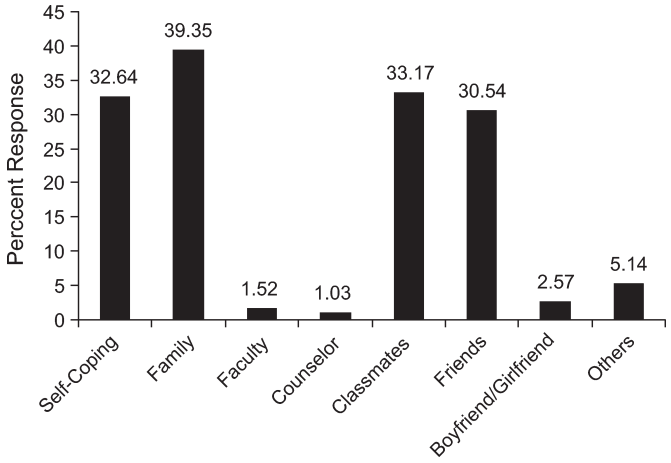

Figure 1. Coping strategies for managing stress and/or anxiety reported by PharmD students.

There was also a significant effect of year of enrollment on test anxiety levels, students' perception of course load, and their ability to manage time with the course work. Most importantly, the mean test anxiety scores were higher for P2 pharmacy students compared to students in other didactic years. Perception of course load among the P2 pharmacy students was the highest and ability to manage time with the course work was the least among P2 students compared with students in other academic years. These results may be attributed to an increase in the course load or to the difficulty of the course material in that particular academic year. At this University, the perceived greater course load in the second year could be attributed to the 7-credit hour comprehensive and integrated course in pharmacodynamics which was a part of the P2 curriculum. Such high-stakes courses could have led to high levels of test anxiety and the perception of increased course load among students. These results are important to understanding student perceptions regarding course material and provide a basis for conducting intervention. Based on these statistics, there is a need to reassess the amount of study material allocated for courses and during examinations, which would help students reduce test anxiety, perform better academically, and gain adequate knowledge through their curriculum.

The negative correlation between time management and test anxiety could be explained by the fact that with better time management and test preparation students would not exhibit test anxiety while taking examinations. Inadequate time management and procrastination of study tasks lead to various study problems.[27] With better time management skills, students would not end up "cramming" for examinations, and thereby decrease test anxiety and improve their academic performance. Further, this study indicated a significant association of test anxiety levels with age, with older students reporting higher test anxiety than younger students. The results obtained were consistent with previous literature indicating significant differences among students in anxiety levels and coping strategies by age.[28]

According to a previous study conducted among nursing students, students who followed coping strategies related to time management skills, nutrition, exercise, relaxation, and cognitive control provided via a stress management intervention program had lower levels of test anxiety.[29] Results of our study underlined the significance of such stress management programs, which would help pharmacy students reduce test anxiety as well as their perception of course load. Though students have access to counselors and faculty members on campus, very few students in our study actually used those resources. Students named their family and classmates as their primary support group during times of stress and/or anxiety. Many students in this study also indicated using self-coping strategies during times of stress and/or anxiety. Thus, this study emphasizes the need for stress and time management programs along with a well-structured pharmacy curriculum in order to reduce test anxiety in students. Future studies should examine the role of such programs and evaluate the effect of such programs on academic performance.

Some limitations should be considered before applying the results obtained in this research. Second-year students had a comprehensive 7-credit hour course in pharmacodynamics which could have increased their perception of course load. The second-year curriculum had the least number of credit hours, yet was perceived by students to be most burdensome with respect to course load. Because curricula across various schools are diverse, these results may not be generalizable to all pharmacy schools, as the study was limited to one university. Further research at more universities in the United States may be necessary to understand students' perception of course load and associated test anxiety. Student perception of course load may include multiple and complex factors that were not evaluated in this study. Future studies should also evaluate interventional programs to reduce stress and anxiety.

CONCLUSIONS

Perceptions of course load and time management are associated with test anxiety. Test anxiety levels, student perception of course load, and their ability to manage time varied based on the academic year in which they were enrolled. Further studies are needed to assess other factors that may lead to test anxiety and to develop interventions to reduce it.

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Appendix 1. Items Used to Measure Test Anxiety on the Questionnaire

For the following statements, please rate yourself according to how well each statement describes you:

1 = not at all typical of me; 2 = not very typical of me; 3 = somewhat typical of me; 4 = fairly typical of me; 5 = very much typical of me

1. Thoughts of doing poorly interfere with my performance on exams
2. During an examination I frequently get so nervous that I forget facts I really know
3. While taking an important exam, I perspire a great deal
4. During exams, I find myself thinking of things unrelated to the actual study material
5. I feel very panicky when I have to take an exam
6. After important tests, I am frequently so tense that my stomach gets upset
7. I usually feel my heart beating very fast during an exam
8. I usually get very depressed after taking an exam
9. I wish exams did not bother me so much
10. Even when I'm well prepared for a test, I feel very anxious about it